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EXAMINER
CHAN, RICHARD

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/682,652	Applicant(s) BARGROFF, KEITH P.	
	Examiner Richard Chan	Art Unit 2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 12 June 2006.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,3-11 and 13-23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1, 3-8, 10, 11 and 13-18, 19-23 is/are rejected.

7)☐ Claim(s) 9 and 19 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 09 October 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dujmenovic (US 6,980,787) in view of Wolkstein (US 5,222,246).

With respect to claim 1, Wolkstein discloses an IQ network comprising: a phase shift circuit **38** having an in-phase mixer **30** port configured to receive the in-phase signal from **amplifier 58**, a quadrature-phase mixer **28** port configured to receive the quadrature phase signal from **amplifier 58**, and an output port, the phase shift circuit **38** configured to provide substantially a .+-.90 degree phase shift between the in-phase and quadrature-phase mixer ports; however, Dujmenovic does not disclose a back termination coupled to the termination port of the phase shift circuit, the back termination having an impedance value substantially equal to the characteristic impedance of the phase shift circuit at the termination port.

However, Wolkstein discloses a back termination **226, 222, 228 and 230** coupled to the termination port of the phase shift circuit **222 Col.3 lines 55-66**, the back termination having an impedance value substantially equal to the characteristic

impedance of the phase shift circuit at the termination port. Wolkstein continues to disclose wherein the termination port **222 of** Wolkstein can be implemented on either the in-phase mixer port **228** or the quadrature-phase mixer **230** port of the impedance-matched IQ network of Dujmenovic.

It would have been obvious to one of ordinary skill in the art to implement the back termination to the phase shifting circuit of Wolkstein to the phase shifting circuit disclosed by Dujmenovic in order to substantially match the input impedance to attenuate signal reflections propagating within the IQ network.

With respect to claim 3, Dujmenovic and Wolkstein combined disclose the impedance-matched IQ network of claim 1, Dujmenovic continues to disclose wherein the phase shift circuit **32** comprises at least one phase shifter. **Fig.2**

With respect to claim 8, Dujmenovic and Wolkstein combined disclose the impedance-matched IQ network of claim 1, however Wolkstein disclose wherein the back termination comprises a resistive element 226.

It would have been obvious to one of ordinary skill in the art to implement a resistive element of Wolkstein as the back termination for the impedance-matched network of Dujmenovic in order to dampen any reflected signals propagating along the phase shift circuit.

With respect to claim 8, Dujmenovic and Wolkstein combined disclose the impedance-matched IQ network of claim 1, Wolktein continues to disclose the impedance matched IQ network further comprising wherein the back termination comprises a resistive element **226**.

3. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dujmenovic and Wolkstein in view of Satoh (US 6,983,129).

With respect to claim 4, Dujmenovic and Wolkstein combined disclose the impedance-matched IQ network of claim 3, however they do not disclose a T-type phase shifter.

The Satoh reference however discloses a T type phase shifter **15,16,17** in a wireless communication frequency switch and wireless communication apparatus.

It would have been obvious to one of ordinary skill in the art to implement a T-type phase shifter of Satoh with the impedance matched IQ network disclosed by Dujmenovic and Wolkstein in order to further have control over the phase of the received signal.

With respect to claim 5, Dujmenovic and Wolkstein disclose the impedance-matched IQ network of claim 3, however does not disclose wherein the at least one phase shifter comprises a plurality of series-coupled distributed T-type or Pi type phase shifters.

The Satoh reference however discloses a T type phase shifter **Fig.1- 15,16,17** in a wireless communication frequency switch and wireless communication apparatus.

With respect to claim 6, Dujmenovic and Wolkstein combined disclose the impedance-matched IQ network of claim 3, however does not disclose wherein the at least one phase shifter comprises a plurality of series-coupled transmission line phase shifters.

The Satoh reference however discloses wherein at least one phase shifter comprises a plurality of series-coupled transmission line phase shifters **114.Fig.2**

It would have been obvious to one of ordinary skill in the art to implement the transmission line phase shifters disclosed by Satoh with the impedance matched IQ network disclosed by Dujmenovic and Wolkstein in order to further have control over the phase of the received signal.

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dujmenovic, Wolkstein, and Satoh in view of Sanada (US 6,862,442).

With respect to claim 10, Dujmenovic, Wolkstein, and Satoh combined disclose the impedance-matched IQ network of claim 4, however Satoh discloses a first T-type L-C phase shifter **15,16,17** comprising a first series capacitor **15**, a second series capacitor **17**, and a first shunt inductor **16** coupled therebetween; however Satoh does

not disclose wherein the plurality of phase shifters comprises three series-coupled T-type L-C phase shifters.

It would have been obvious to one of ordinary skill in the to combined the three phase shifter circuits in series as disclosed by Satoh in order to create an efficient phase shifting circuit in order to correct the incoming RF signal of the receiver

5. Claims 7, 11, 12, 13, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dujmenovic (US 6,980,787) in view of Wolkstein (US 5,222,246) and Aggarwal (US 6,985,698).

With respect to claim 7, Dujmenovic and Wolkstein combined disclose the impedance-matched IQ network of claim 1, however Aggarwal discloses further comprising a matching network 20.

It would have been obvious to one of ordinary skill in the art to implement a matching network of Aggarwal with the phase shifter of Dujmenovic in order to obtain preferred performance of the IF stage of the receiver.

With respect to claim 11, Dujmenovic discloses an image rejection circuit, comprising: an in-phase mixer 30; a quadrature phase mixer 28; : a phase shift circuit 38 having an in-phase mixer 30 port coupled to the in-phase mixer, a quadrature-phase mixer 28 port coupled to the quadrature phase mixer, a termination port, and an output port, the phase shift circuit 38 configured to provide substantially a .+-.90 degree phase

shift between the in-phase and quadrature-phase ports; however Dujmenovic does not disclose an impedance-matched IQ network coupled to the in-phase mixer and to the quadrature phase mixer, the impedance-matched IQ network comprising a back termination coupled to the termination port of the phase shift circuit, the back termination having an impedance value substantially equal to the characteristic impedance of the phase shift circuit at the termination port.

The Aggarwal reference however discloses an impedance-matched IQ network Fig.2 20 coupled to the in-phase mixer 9 and to the quadrature phase mixer 10, the impedance-matched IQ network.

And the Wolkstein reference discloses the back termination 226 having an impedance value substantially equal to the characteristic impedance of the phase shift circuit at the termination port **224 Col.3 lines 55-66**. Wolkstein continues to disclose wherein the termination port 228 and 230 comprises either the in-ohase mixer port 228 or the quadrature phase mixer port 230 of the phase shift circuit.

It would have been obvious to one of ordinary skill in the art to implement a impedance matching circuit of Aggarwal with the phase shifter of Dujmenovic in order to obtain preferred performance of the IF stage of the receiver.

And it would have been obvious to one of ordinary skill in the art to implement a back termination portion with substantially equal characteristic impedance of the phase shift circuit of Wolkstein to the receiver of Dujmenovic in order to dampen any reflected signals propagating along the phase shift circuit.

With respect to claim 13, Dujmenovic, Aggarwal, and Wolkstein combined disclose the image rejection circuit of claim 11, however Dujmenovic continues to disclose wherein the phase shift circuit comprises at least one phase shifter 38.

With respect to claim 21, Dujmenovic, Aggarwal, and Wolkstein combined disclose the image rejection circuit of claim 11, however Aggarwal continues to disclose wherein the image rejection circuit is further comprising a first bypass capacitor 25 coupled to the in-phase mixer, and a second bypass capacitor 27 coupled to the quadrature-phase mixer.

It would have been obvious to one of ordinary skill in the art to implement a first and second capacitor to be coupled to the quadrature-phase mixer as disclosed by Aggarwal in order to smooth the signal that is output from the mixers to the impedence matching network of the receiver to the receiver of Dujmenovic and Wolkstein.

With respect to claim 22, Dujmenovic, Aggarwal, and Wolkstein combined disclose the image rejection circuit of claim 11, however Aggarwal continues to disclose wherein the in-phase and quadrature-phase mixers 9 and 10 each comprise differential mixer ports coupled to the impedance-matched IQ network 20, the impedance-matched network 20 further comprising bypass capacitors 25 and 27 coupled to each of the in-phase and quadrature-phase differential mixer ports of mixers 9 and 10.

It would have been obvious to one of ordinary skill in the art to implement a first and second capacitor to be coupled to the quadrature-phase mixer as disclosed by

Aggarwal in order to smooth the signal that is output from the mixers to the impedence matching network of the receiver to the receiver of Dujmenovic and Wolkstein.

6. Claims 14-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dujmenovic (US 6,980,787) and Wolkstein (US 5,222,246) and Aggarwal (US 6,985,698) in view of Satoh (US 6,983,129).

With respect to claim 14, Dujmenovic, Aggarwal, and Wolkstein disclose the image rejection circuit of claim 13, however they do not disclose wherein the at least one phase shifter comprises a plurality of series-coupled pi- or T-type phase shifters.

The Satoh reference discloses wherein the at least one phase shifter comprises a plurality of series-coupled pi- or T-type phase shifters **15,16,17**.

It would have been obvious to one of ordinary skill in the art to implement a T type phase shifter as disclosed by Satoh with the receiver as disclosed Dujmenovic, Aggarwal, and Wolkstein in order to correctly shift the phase of the incoming signal.

With respect to claim 15, Dujmenovic, Aggarwal, and Wolkstein disclose the image rejection circuit of claim 13, however Satoh disclose wherein the at least one phase shifter comprises a plurality of series-coupled distributed pi- or T-type phase shifters **15,16,17**.

With respect to claim 16, Dujmenovic, Aggarwal, and Wolkstein disclose the image rejection circuit of claim 13, however does not disclose wherein the at least one phase shifter comprises a plurality of series-coupled transmission line phase shifters.

It would have been obvious to one of ordinary skill in the art to implement a line phase shifter with the receiver disclosed by Dujmenovic, Aggarwal, and Wolkstein in order to correctly shift the phase of the incoming receiving signal.

With respect to claim 17, Dujmenovic, Aggarwal, and Wolkstein discloses the image rejection circuit of claim 11, however Aggarwal continues to disclose further comprising a matching network 20 coupled to the output port.

It would have been obvious to one of ordinary skill in the art to implement a matching network of Aggarwal with the phase shifter of Dujmenovic in order to obtain preferred performance of the IF stage of the receiver.

With respect to claim 18, Dujmenovic, Aggarwal, and Wolkstein discloses the image rejection circuit of claim 11, however Wolkstein discloses wherein the back termination 226 comprises a resistive element 226.

And the Wolkstein reference discloses the back termination 226 having an impedance value substantially equal to the characteristic impedance of the phase shift circuit at the termination port **224 Col.3 lines 55-66**.

With respect to claim 20, Dujmenovic, Aggarwal, Wolkstein, and Satoh combined disclose the impedance-matched IQ network of claim 14, however Satoh discloses a first T-type L-C phase shifter **15,16,17** comprising a first series capacitor **15**, a second series capacitor **17**, and a first shunt inductor **16** coupled therebetween; however Satoh does not disclose wherein the plurality of phase shifters comprises three series-coupled T-type L-C phase shifters.

It would have been obvious to one of ordinary skill in the to combined the three phase shifter circuits in series as disclosed by Satoh in order to create an efficient phase shifting circuit in order to correct the incoming RF signal of the receiver

7. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aggarwal (US 6,985,698) in view of Wolkstein (US 5,222,246).

With respect to claim 23, Aggarwal discloses an impedance-matched IQ network 20 Fig.1 and Fig.2 configured to provide substantially a .+-.90 degree phase shift with phase shifter 6 and 12 to a received quadrature phase signal Q_IN relative to a received an in-phase signa I_IN , and to provide a summation of the .+-.90 degree phase-shifted quadrature phase signal and the received in-phase signal with signal adder 13, the impedance matched IQ network 20 comprising: phase shifting means having an in-phase mixer port 9 configured to receive the in-phase signal, a quadrature-phase mixer port 10 configured to receive the quadrature phase signal, and an output port 31 and 32, the phase shift circuit 12 and 6 configured to provide substantially a .+-

.90 degree phase shift between the in-phase and quadrature-phase mixer ports; however Aggarwal does not disclose wherein the network contains a termination means coupled to the termination port of the phase shifting means, the termination means having an impedance value substantially equal to the characteristic impedance of the phase shift means at the termination port.

The Wolkstein reference however discloses wherein the network contains a termination 226 means coupled to the termination port 224 of the phase shifting means 258, the termination means 226 having an impedance value substantially equal to the characteristic impedance of the phase shift means at the termination port.

It would have been obvious to one of ordinary skill in the art to implement the back termination to the phase shifting circuit of Wolkstein to the phase shifting circuit disclosed by Aggarwal in order to substantially match the input impedance to attenuate signal reflections propagating within the IQ network.

Allowable Subject Matter

8. Claims 9 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 9 and 19 disclose three LC phase shifter circuits comprising first and second shunt inductors coupled a first series capacitors within an impedence matched IQ network.

Response to Arguments

9. Applicant's arguments filed 6/12/06 have been fully considered but they are not persuasive.

With respect to applicant's arguments that the Wolkstein reference does not disclose for a back termination port which has a phase shift circuit having I-and Q-ports for receiving operating as a termination port. However the Wolkstein reference discloses a RF signal source of outputting a signal into element 222 which in turns outputs signal with similar amplitude, however with a 90 degree phase shift from port 228 and 230. These signals are interpreted as the I with in-phase signal from port 228 and the Q with the quadrature phase signal, which is phase, shifted 90 degrees.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Chan whose telephone number is (571) 272-0570. The examiner can normally be reached on Mon - Fri (9AM - 5PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Quochien Bu Vuong 9/18/06

QUOCHIEN B. VUONG
PRIMARY EXAMINER

Richard Chan
Art Division 2618
9/15/06